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Using the Doctrine of Equivalents to Provide Broad Protection for Pioneer Patents: Limited Protection for Improvement Patents

I. Introduction

Courts engage in a two-part analysis when deciding the issue of infringement¹ during patent disputes. In the first step, the claims² are interpreted. Claim interpretation involves a review of the patent specification,³ the prosecution history,⁴ and, if necessary, extrinsic evidence such as expert testimony.⁵ In the second step, the product accused of infringing is compared to the claimed invention.⁶ Literal infringement is found when “properly interpreted claims read⁷ on the accused product or

1. An infringement of a patent is a violation of the property right in that patent. Section 271 (a) of the Patent Act states, in pertinent part, “[w]hoever without authority makes, uses or sells any patented invention, within the United States during the term of the patent therefor, infringes the patent.” 35 U.S.C. § 271 (1982 & Supp. 1988).

2. The claims of the patent provide a concise formal definition of the invention. They must “particularly [point] out and distinctly [claim] the subject matter which the applicant regards as his invention.” 35 U.S.C. § 112 (1982 & Supp. 1988).

3. The specification of a patent must describe the manner and process of making and using the patent so that any person skilled in the patent’s art may use it. The specification “set[s] forth the best mode contemplated by the inventor of carrying out his invention.” *Id.*

4. The prosecution history of a patent application includes all of the correspondence, including all statements and claim amendments, between the Patent and Trademark Office [PTO] and the inventor or his agent. 37 C.F.R. § 1.2 (1988). This written history is known as the file history (or file wrapper) of the patent.

5. For an overview of patent infringement analysis, see *Autogiro Co. v. United States*, 384 F.2d 391, 397-99 (Ct. Cl. 1967) and *McGill, Inc. v. John Zink Co.*, 736 F.2d 666, 673-75 (Fed. Cir. 1984).

6. This was first articulated in *Winans v. Denmead*, 56 U.S. (15 How.) 330 (1853). See also *Senmed, Inc. v. Richard Allan Medical Indus.*, 888 F.2d 815 (Fed. Cir. 1989); *ZMI Corp. v. Cardiac Resuscitator Corp.*, 844 F.2d 1576 (Fed. Cir. 1988); *McGill Inc. v. John Zink Co.*, 736 F.2d 666 (Fed. Cir. 1984); *Coleco Indus. v. United States Int’l Trade Comm’n*, 573 F.2d 1247 (C.C.P.A. 1978).

7. When the accused device or process is substantially described by the claims set forth in the invention, it “reads on” the invention. 4 DONALD CHISUM, PATENTS § 18.01 (1978 & Supp. 1990).

method.”⁸ If literal infringement is found, that is the end of the inquiry. If literal infringement cannot be established because the parameters of the claims are not met, the accused invention may yet be found to infringe under the doctrine of equivalents.⁹

The equivalents test applied by the courts was articulated by the Supreme Court in *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*¹⁰ The Court held that “a patentee may invoke this doctrine to proceed against the producer of a device ‘if it performs substantially the same function in substantially the same way to obtain the same result’.”¹¹

Since *Graver Tank*, this three-part test has been used by all courts in deciding equivalence. However, the precise application of this standard to a particular patent in controversy is in dispute. The Court of Appeals for the Federal Circuit (CAFC) interchangeably applies the *Graver Tank* test using two distinct analyses — the “element by element” test¹² and the “device as a whole” test.¹³ This Note will show, however, that neither of these tests has clearly articulated how broadly to extend equivalence in a given infringement analysis.

The doctrine of equivalents was extensively used for a century by the Supreme Court to protect pioneer patents against infringement.¹⁴ Those patents which, in comparison with the prior art,¹⁵ were deemed truly pioneering were accorded broad protection under the doctrine of equivalents. In so doing, the Court looked to the entire device or machine before deciding in-

8. *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 1269-70 (Fed. Cir. 1986).

9. *Autogiro*, 384 F.2d at 400. See also *Coleco Indus.*, 573 F.2d at 1253-54.

10. 339 U.S. 605 (1950). See also *infra* notes 105-118 and accompanying text.

11. 339 U.S. at 608 (citations omitted) (also known as the “function/way/result” test).

12. See, e.g., *Pennwalt Corp. v. Durand Wayland Inc.*, 833 F.2d 931 (Fed. Cir. 1987) (en banc), cert. denied, 485 U.S. 961 (1988).

13. See, e.g., *Texas Instruments v. Int’l Trade Comm’n*, 846 F.2d 1369 (Fed. Cir. 1988).

14. See *infra* notes 31-104 and accompanying text.

15. To be patentable, an invention must be distinguishable from the prior art (technology and teaching already in the public domain). 35 U.S.C. § 103 (1982 & Supp. 1988). To this end, before granting a patent, the patent examiner conducts a search of issued patents and relevant technical literature. See, e.g., *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 454-55 (Fed. Cir. 1985) (where a patent for the catalytic manufacture of acrylamide was declared invalid in light of two prior art references).

fringement.¹⁶ On the other hand, if the patent was ascertained to be an improvement patent, the Court would provide only limited protection. The scope of this protection would be determined by the specific characteristics embodied in the claims.¹⁷

However, by the mid-twentieth century, the "as a whole" approach was extending broad protection to non-pioneering, but innovative, patents as well.¹⁸ The doctrine of equivalents had become a mechanism to implement a policy of broad protection for all patents.¹⁹ This continued to be the state of affairs in infringement analysis until recently, when the Federal Circuit introduced the "element by element" analysis in its application of the doctrine.²⁰ Since then, the Federal Circuit has alternated between the two tests without rhyme or reason, creating confusion in infringement analysis.²¹

A policy question which continues to confront courts deciding infringement cases is how to best use the doctrine of equivalents to protect and reward basic research and technology without stifling future advances.²² In claiming a patent, the inventor gives notice to the public as to what is protected, thereby permitting another to "design around" the patent.²³ Thus, a court confronted with the correct application of the doctrine of equivalents in an infringement case is also confronted with striking a balance between these two interests.

This Note reconciles the application of the doctrine of equivalents with the protection of innovative and useful research, focusing on biotechnology. Section II describes the history of the doctrine of equivalents and its use by the Supreme Court to protect pioneer patents. Section III examines the modern use of this doctrine, including the conflict within the Federal Circuit on its proper application and its relationship to the doctrine of file history estoppel. Section IV addresses the failed attempts by the Federal Circuit to implement a coherent test for

16. See, e.g., *Winans v. Denmead*, 56 U.S. (15 How.) 330 (1853).

17. See *infra* notes 46-52 and accompanying text.

18. See *infra* notes 95-104 and accompanying text.

19. See *infra* notes 105-140 and accompanying text.

20. See *infra* notes 143-168 and accompanying text.

21. See *infra* notes 169-239 and accompanying text.

22. See, e.g., *In re Hogan*, 559 F.2d 595, 606 (C.C.P.A. 1977).

23. *State Indus., Inc. v. A.O. Smith Corp.*, 751 F.2d 1226, 1236 (Fed. Cir. 1985).

applying the doctrine and the particular problems faced in adjudicating infringement of biotechnology patents without a useful standard. This section also presents a unified theory for the modern application of the doctrine of equivalents. The Note concludes, in section V, that in order to encourage new and innovative research, the courts must return to the original *raison d'être* for the doctrine of equivalents by providing broad protection for pioneer patents.

II. Background

A. *The Historical Purpose of Patent Protection*

The historical purpose of patent protection has been to encourage progress by protecting the inventor in return for disclosing the subject matter of the invention to the public. This purpose was expressed in the United States Constitution²⁴ and codified in the first two Patent Acts, passed in 1790 and 1793.²⁵ The Acts required that a petition for a patent include a written specification describing the invention and a declaration that the inventor believed himself to be the true inventor.²⁶ In return for conferring an "exclusive right on an inventor", the statute required him to "give the public the full benefit of the discovery."²⁷

The Patent Act of 1836 established the examination method for granting patents and created the Patent Office for this purpose.²⁸ Both the 1836 and 1870 Acts required that the inventor "particularly point out and distinctly claim" his invention or discovery.²⁹

The Supreme Court expressed the dual purpose of the patent laws as promoting scientific advancement and securing exclusive rights to inventors in their own property.³⁰ Whatever the

24. "The Congress shall have Power . . . To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries" U.S. CONST. art. I, § 8, cl. 8.

25. Patent Act of 1790, ch. 7, 1 Stat. 109-12 (repealed 1793); Patent Act of 1793, ch. 11, 1 Stat. 318-23 (repealed 1836).

26. *Id.*

27. *Evans v. Eaton*, 20 U.S. (7 Wheat.) 356, 429-33 (1822).

28. Patent Act of 1836, ch. 357, 5 Stat. 117, 119-20 (repealed 1870).

29. *Id.*; Patent Act of 1870, ch. 230, § 26, 16 Stat. 198, 201 (repealed 1952).

30. *Winans v. Denmead*, 56 U.S. (15 How.) 330, 341 (1853).

revisions of a particular patent act, the articulated purpose has remained the same.

B. *Early Supreme Court Cases Applying the Doctrine of Equivalents*

1. *Broad Protection for Pioneer Patents; Limited Protection for Improvement Patents*

In the earliest patent infringement cases³¹ to reach the Supreme Court, the doctrine of equivalents was applied broadly to protect primary or pioneer inventions and was applied narrowly to limit protection for improvement inventions.³² Analysis of a case would begin with a review of the prior art to ascertain the pioneer or improvement status of the plaintiff's patent. The Court would then proceed to examine where the accused invention stood in relation to the plaintiff's patent and to determine whether infringement had occurred.

Evans v. Eaton,³³ one of the earliest patent cases to reach the Supreme Court, used this analytical approach. The question before the Court was whether the patent for a machine used in the manufacture of flour had been infringed.³⁴ Justice Story reviewed the doctrine of equivalents as it had been applied by the

"[T]he design of the Constitution and the patent laws of the United States, [is] to promote the progress of the useful arts, and allow inventors to retain to their own use . . . what they themselves

have created." See also *Machine Co. v. Murphy*, 97 U.S. 120, 121 (1877) ("Rights secured to an inventor by letters-patent are property which consists in the exclusive privilege of making and using the invention . . .").

31. Several of these cases include the legal history of the doctrine which dates back to the English courts. See, e.g., *Evans v. Eaton*, 20 U.S. (7 Wheat.) 356, 399-407 (1822).

32. In the early nineteenth century, a pioneer invention was described as "something which was entirely unknown before." *Id.* at 379. An improvement was described as "an addition to or an alteration in what was previously known." *Id.*

Sixty-seven years later, in *Morley Sewing Machine Co. v. Lancaster*, 129 U.S. 263 (1889), the Court defined a pioneer invention as "one of primary character . . ." An improvement was "a mere change of form or combination of parts . . ." *Id.* at 274 (citations omitted).

A modern definition of a pioneer invention is one which "first . . . disclose[s] a basic operational concept"; an improvement patent is one which issues "in a crowded art." *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1362 (Fed. Cir. 1983).

33. 20 U.S. (7 Wheat.) 356 (1822).

34. *Id.* at 357-59.

circuit court to this patent in an earlier action.³⁵ The circuit court had invalidated the patent on the ground that it was substantially the same as an earlier machine not at issue in this case.³⁶ The reasoning by the circuit court had been that "if the two machines be substantially the same, and operate in the same manner, to produce the same result, though they may differ in form, proportions, and utility, they are the same in principle . . ."³⁷

The Supreme Court affirmed the lower court's holding that the invention in controversy was not original or new. The Court based its result on a review of the prior art and determined that the patented machine was an improvement, not an original invention.³⁸ Justice Story agreed with the circuit court's decision to invalidate the patent because "simply changing the form or the proportion of any machine or composition of matter, in any degree, shall not be deemed a discovery."³⁹ In invalidating the patented invention, the Court applied the doctrine of equivalents, albeit not explicitly, and granted broad protection to an invention which antedated the two in dispute.

The doctrine of equivalents was explicitly used to find infringement in *Winans v. Denmead*.⁴⁰ The circuit court had held that the accused invention, an octagonal railroad car used to transport coal, did not infringe on plaintiff's conical car.⁴¹

The Supreme Court first compared the plaintiff's patent to the prior art, and concluded that "the patentee ha[d] introduced a mode of operation not before employed . . ."⁴² The Court then found infringement because "to copy the principle or mode of operation described, is an infringement, although such copy should be totally unlike the original in form or proportions."⁴³ Furthermore, "where the whole substance of the invention may be copied in a different form . . . it is not a defense, that it is

35. *Id.* at 427-29.

36. *Id.* at 370.

37. *Id.* at 361.

38. *Id.* at 430, 435.

39. *Id.* at 429.

40. 56 U.S. (15 How.) 330 (1853).

41. *Id.* at 340.

42. *Id.* at 339.

43. *Id.* at 342.

embodied in a form not described”⁴⁴ Thus, the Court looked to the whole invention in finding infringement. Justice Curtis admonished the courts, saying “[i]t is the duty of courts and juries to look through the form for the substance of the invention”⁴⁵ This analysis was followed in subsequent cases.

In *McCormick v. Talcott*,⁴⁶ the Supreme Court distinguished between the equivalents range permitted to an improvement patent and to a pioneering one. The Court conceded that an original invention was broadly protected over an accused device even if the latter was a patentable improvement.⁴⁷ However, if the claimed invention was only an improvement on an existing device, it could not be accorded protection against another improvement of the same device which performs the same function in a different manner.⁴⁸ The Court was in effect using an “as a whole” analysis to protect original inventors and a rudimentary form of the “element by element” analysis for inventors of improvements.

The Court followed the precedent of granting only limited protection to an improvement patent in *Burr v. Duryee*.⁴⁹ The invention in controversy, a machine used in forming hat bodies,⁵⁰ was “an improvement . . . not founded on any new discovery.”⁵¹ The Court reasoned that an inventor of an improvement cannot “have a claim to the whole art, discovery, or machine which he has improved. All others have an equal right to make improved machines”⁵² Thus, the Court held that the accused machine did not infringe.

The breadth of protection accorded an innovative machine

44. *Id.* at 343.

45. *Id.*

46. 61 U.S. (20 How.) 402 (1857).

47. *Id.* at 405. (An improvement invention may be sufficiently different from the original to merit patentability, yet be found to infringe under a broad application of the doctrine of equivalents).

48. *Id.* “The inventor of the first improvement cannot invoke the doctrine of equivalents to suppress all other improvements which are not mere colorable invasions of the first.” *Id.*

49. 68 U.S. (1 Wall.) 531 (1864).

50. *Id.* at 570-74. “Hat-bodies are manufactured out of fibres of fur or wool felted together.” *Id.* at 533. A “hat-body” is the foundation on which hats are formed. *Id.* at 537.

51. *Id.* at 574.

52. *Id.* at 571.

was demonstrated in *Blake v. Robertson*.⁵³ The Supreme Court compared a stone crushing machine to its prior art and upheld the validity of its patent because it was "radical[ly different], and [went] to the essence of the organisms."⁵⁴ The Court then held that the invention of the complainant had embodied all of the ideas of the patented invention and that it infringed.⁵⁵ Thus, a machine which used hydraulic pressure to crush rocks, infringed on a machine which used rods and levers because the Court found it "difficult to resist the conclusion that the change had no motive or purpose but evasion."⁵⁶

As the nineteenth century advanced, new machinery was sometimes innovative without necessarily being the very first in its class. In *Machine Co. v. Murphy*,⁵⁷ neither party in the case claimed to be the first and original inventor of a machine for making paper bags.⁵⁸ However, the Supreme Court found that the patentee was the first to perfect this particular method for making bags.⁵⁹ Because he had created an original invention, the Court invoked broad protection and held that the knife in the accused machine was "substantially the same thing as the cutter in the [complainant's] machine"⁶⁰ Justice Clifford enunciated the standard three-part equivalents test in language almost identical to that adopted by Justice Story some 50 years earlier in *Evans v. Eaton*.⁶¹ The Court said that machines are to be examined:

in the light of what they do, or what office or function they perform, and how they perform it, and to find that one thing is substantially the same as another, if it performs substantially the same function in substantially the same way to obtain the same

53. 94 U.S. 728 (1876). In this case, the party bringing the action attempted to invalidate the earlier patent on the ground of lack of novelty. *Id.* Both of the inventions were machines which crushed stones. *Id.* at 730. The earlier invention used rods and levers to move the crushing jaw; the later device used hydraulic pressure. *Id.* at 732.

54. *Id.*

55. *Id.* at 733.

56. *Id.* at 732-33.

57. 97 U.S. 120 (1877).

58. *Id.* at 122.

59. *Id.* at 123-24.

60. *Id.* at 126.

61. 20 U.S. (7 Wheat.) 356 (1822). See *supra* notes 33-39 and accompanying text.

result . . . even though they differ in name, form or shape.⁶²

While earlier cases had involved patents for machines, the patent in *Tilghman v. Proctor* involved a process for separating fats into their components.⁶³ After an extensive review of the prior art, the Court held that a patent could be granted for a process,⁶⁴ reasoning that:

[a] process [may be] susceptible of being applied in many modes and by the use of many forms of apparatus. The inventor is not bound to describe them all in order to secure to himself the exclusive right to the process, if he is really its inventor or discoverer.⁶⁵

Thus, the *Tilghman* Court held that a patent could be obtained for any process if the patentee was the first and original inventor of that process.⁶⁶ Although only one method for applying the process had been specified in the original patent, the accused patent infringed in that "the process of [the plaintiff patent], modified or unmodified by the supposed improvement, underlies the operation performed" by defendants.⁶⁷ An original process would be protected broadly even if only one mode for carrying out the process was specified.⁶⁸

In *Morley Sewing Machine Co. v. Lancaster*, the Supreme Court addressed the question of whether a combination invention could be protected from infringement.⁶⁹ Patents for complex machines which can perform a series of tasks are called combination patents.⁷⁰ In *Morley*, the patented device was a sewing machine which was made up of three main groups of instrumentalities to automatically sew on buttons.⁷¹

The Court confirmed the circuit court's finding that the pat-

62. *Murphy*, 97 U.S. at 125.

63. 102 U.S. 707 (1881).

64. *Id.* at 722.

65. *Id.* at 728-29.

66. *Id.* at 722-28.

67. *Id.* at 732.

68. *Id.* at 730.

69. 129 U.S. 263 (1889).

70. Combination machines exist in several forms. One form "embrace[s] both a new element and new combination of elements, previously used and well known." Another form is one in which "all the elements of the machine are old, and where the invention consists in a new combination of those elements" 1 DONALD CHISUM, PATENTS § 1.02[2] (1978 & Supp. 1990) (citations omitted).

71. *Morley*, 129 U.S. at 265-70.

entee was the first to succeed in producing this type of machine.⁷² The patentee was therefore entitled to a liberal construction of the claims of the patent because "[h]e was not a mere improver upon a prior machine . . . in which case, his claims would properly receive a narrower interpretation."⁷³ The Court summarized the well-settled law of the doctrine of equivalents in the United States and England:

Where an invention is one of a primary character, and the mechanical functions performed by the machine are, as a whole, entirely new, all subsequent machines which employ substantially the same means to accomplish the same result are infringements, although the subsequent machine may contain improvements in the separate mechanisms which go to make up the machine.⁷⁴

Applying these criteria to the case at hand, the Court reversed the circuit court and held that the accused machine, in which three sets of mechanisms were also combined, infringed.⁷⁵ In so doing, the Court granted broad protection to a multifunctional machine, despite the fact that some of the infringing machine's mechanisms were different. It reasoned that the first invention was of a primary character and that the main operative features of both machines were the same.⁷⁶ Subsequent cases continued to accord a range of equivalents based on the distinction between a pioneer invention and an improvement invention.⁷⁷

2. *Use of Patent File History to Limit Improvement Patents*

As demonstrated in the preceding section, the Supreme Court had been using a specific approach in deciding whether a

72. *Id.* at 273.

73. *Id.*

74. *Id.*

75. *Id.* at 284.

76. *Id.*

77. See, for example, *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894), where the patented invention was for a spring on a wheel cultivator. *Id.* at 188. The Court held that the patented device "cannot be treated as a pioneer in the art. Neither [the inventor], nor his assignee, [can] be allowed to invoke the doctrine of equivalents, such as the courts extend to primary inventions, so as to include all forms of spring devices . . ." *Id.* at 207.

patent in controversy was infringed under the doctrine of equivalents. The first step in this approach relied upon classifying the invention as either a pioneer or an improvement in relation to its prior art.

In *Westinghouse v. Boyden Power Brake Co.*,⁷⁸ the Supreme Court began its analysis with an exhaustive review of the history of brakes, their improvements and their respective patents.⁷⁹ But before proceeding to an examination of the pioneer or improvement status of the Westinghouse brake, the Court instead reviewed the file history of its patent.⁸⁰ The Court found that the original patent application had contained a broad claim which had been rejected by the PTO on the basis of prior art.⁸¹ This claim was subsequently narrowed by the patentee in order to avoid the prior art.⁸²

Next, the Court examined whether the Westinghouse patent was a pioneer patent. The definition used was one which "cover[s] a function never before performed, a wholly novel device, or one of such novelty and importance as to mark a distinct step in the progress of the art"⁸³ The Court held that the Westinghouse invention could not be considered a pioneer because it was never put into successful operation, and to some extent had been anticipated by an earlier patent.⁸⁴

Next, the Court considered infringement. It conceded that the two devices performed virtually the same functions.⁸⁵ However, just because the "two machines produce the same effect will not justify the assertion that they are substantially the same, or that the devices used are, therefore, mere equivalents for those of the other."⁸⁶ The devices were held not mechanical equivalents because they used significantly different means to

78. 170 U.S. 537 (1898).

79. *Id.* at 545-53. The patent in suit was for a fluid pressure automatic brake mechanism, to be used primarily in trains. *Id.*

80. *Id.* at 558-61.

81. *Id.* at 558.

82. *Id.* at 558-60. The Court found that the claim had been limited to a "triple valve . . . provided with an auxiliary valve" *Id.* at 559. The claim could therefore not be construed as being a claim for a method or process of braking. *Id.* at 560.

83. *Id.* at 561-62.

84. *Id.* at 562.

85. *Id.* at 571.

86. *Id.* at 569 (quoting *Burr v. Duryee*, 68 U.S. (1 Wall.) 531, 573 (1864)).

accomplish the same function.⁸⁷ Moreover, the accused device was a novel and manifest departure from the Westinghouse patent.⁸⁸ Thus, the Court held that there was no infringement.⁸⁹

By placing primary reliance on the file history of the patent to limit the scope of the patented claims, the *Westinghouse* Court introduced a new concept into infringement analysis. The Court's holding was also supported by the fact that the accused device used different means to achieve the same result. The discussion of pioneer status was secondary.

In a vigorous dissent, Justice Shiras disagreed with the Court's use of the file history to limit the scope of the patent saying that "the courts should be slow to permit their construction of a patent . . . to be affected or controlled by alleged inter-locations between the officers in the Patent Office and the claimant."⁹⁰

File history was also used to limit the scope of a patent in *Singer Mfg. Co. v. Cramer*.⁹¹ The patentee rested his claim for infringement on the ground that his combination patent was a pioneer and, as such, the claims were entitled to a broad and liberal construction.⁹² However, after examination of the prior art, the Court held that the patent was not a primary one and therefore not entitled to receive broad protection.⁹³ The Court then looked at the file history of the patent in order to help con-

87. *Id.* at 571.

88. *Id.* at 572.

89. *Id.*

90. *Id.* at 582 (Shiras, J., dissenting). Justice Shiras also urged that the Westinghouse patent was indeed a pioneer invention "entitled to a broad or liberal construction." *Id.* at 574 (Shiras, J., dissenting).

[T]he law does not require that a discoverer or inventor, in order to get a patent for a process, must have succeeded in bringing his art to the highest degree of perfection [A] patent for such a discovery is not to be confined to the mere means [the inventor] improvised to prove the reality of his conception.

Id. at 581 (Shiras, J., dissenting).

91. 192 U.S. 265 (1904). The device in controversy was a sewing machine treadle. *Id.* at 265.

92. *Id.* at 276. The Court reiterated that

[the] word [pioneer] . . . is commonly understood to denote a patent covering a function never before performed, a wholly novel device, or one of such novelty and importance as to mark a distinct step in the progress of the art, as distinguished from a mere improvement or perfection of what had gone before.

Id.

93. *Id.* at 276.

strue the scope of the claim. The conclusion was that the claim was limited to the specification and that there was no infringement.⁹⁴

Before *Westinghouse*, the Supreme Court's infringement analysis, using the doctrine of equivalents, began with a determination of where the invention in controversy fit into the prior art. If the invention was found to be a pioneer, the Court permitted broad protection by looking at the patented device as a whole. If instead, the patent was for an improvement, the Court allowed only a narrow range of equivalents. Starting with *Westinghouse*, both the specification and the file history of the patent were used to limit the scope of the claims.

C. *The Modern Doctrine of Equivalents*

1. *Protection of Non-Pioneer, but Meritorious, Patents*

In *Continental Paper Bag Co. v. Eastern Paper Bag Co.*,⁹⁵ the disputed patent was not for the first machine produced to make self-opening square bags and was not therefore, strictly speaking, a pioneer invention.⁹⁶ Nevertheless, the Court decided that precedent did not support the supposition "that only pioneer patents are entitled to invoke the doctrine of equivalents."⁹⁷ It confirmed the lower court's finding that the invention was one "of high rank" and used the patent's file history to show that the patentee had not in any way limited the scope of the claims.⁹⁸

Thus, for the first time, the Court held that a non-pioneer patent could be accorded broad protection under the doctrine of equivalents. To obtain such protection, the Court required that the invention be innovative in some sense and that the patentee's own words, as recorded in the file history, not limit the claims.⁹⁹

94. *Id.* at 278.

95. 210 U.S. 405 (1908).

96. *Id.* at 414.

97. *Id.* at 415.

98. *Id.* at 414, 419-20.

99. *Id.* at 419. The Court had skirted this same question a few years earlier in *Machine Co. v. Murphy*, 97 U.S. 120 (1878). At that time, the Court had not directly addressed the issue of what range of equivalents to afford improvement patents. The Court merely found that the patentee had been the first to make that particular type of device

The concept that all patents of merit should be accorded a broad range of protection under the doctrine of equivalents was taken a step further in *Sanitary Refrigerator Co. v. Winters*.¹⁰⁰ The device in controversy was a swinging lever latch for refrigerators.¹⁰¹ In its analysis of the invention, the Court said that "while this patent came into a prior art crowded with various latch devices . . . and was not a pioneer patent entitled to a broad range of equivalents, the structure . . . was meritorious and soon attained a large measure of commercial success."¹⁰² The Court held that the accused device infringed since it was "substantially identical, operating upon the same principle, and accomplishing the same result in substantially the same way."¹⁰³

In giving broad equivalents protection to a non-pioneering, but important and successful patent, the Court was following the lead of *Continental Paper Bag*.¹⁰⁴ Although neither patent in these two cases was for a pioneer invention, each had been accorded broad protection because the Court nevertheless found criteria of innovation, merit and success.

2. *Protection of Pioneer and Improvement Inventions*

*Graver Tank & Mfg. Co. v. Linde Air Prods.*¹⁰⁵ stands for the proposition that any invention can be accorded broad protection from infringement under the doctrine of equivalents and has become a touchstone of modern patent infringement law.¹⁰⁶ The patent in controversy was for an electric welding composition (flux) containing two alkaline earth metal silicates — cal-

and held that the accused device infringed because it was almost identical to the former in structure and function. *Id.* at 125. See *supra* notes 57-60 and accompanying text.

In *Continental Paper Bag*, the Court had also devoted a portion of the opinion to reviewing the policy of American patent laws and affirmed that inventors must be protected. "The inventor is one who has discovered something of value. It is his absolute property." *Continental Paper Bag*, 210 U.S. at 424.

100. 280 U.S. 30 (1929).

101. *Id.* at 36.

102. *Id.* at 39-40.

103. *Id.* at 41.

104. See *supra* notes 95-99 and accompanying text.

105. 339 U.S. 605 (1950).

106. For further discussion of the role of this opinion in the caselaw, see Judge Newman's commentary in *Pennwalt v. Durand-Wayland, Inc.* 833 F.2d 931, 954 (Fed. Cir. 1987) (en banc).

cium and magnesium.¹⁰⁷ The accused flux substituted silicates of calcium and manganese, the latter being a non-alkaline earth metal.¹⁰⁸

The Court, in considering the doctrine of equivalents, stated: "to permit imitation of a patented invention which does not copy every literal detail would be to convert the protection of the patent grant into a hollow and useless thing."¹⁰⁹ Justice Jackson, citing the language of *Sanitary Refrigerator*, held that "a patentee may invoke this doctrine . . . 'if it performs substantially the same function in substantially the same way to obtain the same result'."¹¹⁰ Thus, a court must consider a patent ingredient in light of its purpose, its function, and its qualities in combination with other ingredients.¹¹¹

The criterion to be used is the invention as a whole because otherwise "the unscrupulous copyist [would] make unimportant and insubstantial changes and substitutions in the patent which, though adding nothing, would be enough to take the copied matter outside the claim"¹¹² This was an articulation of a broad doctrine of equivalents applied to an invention as a whole. Furthermore, the Court extended the doctrine to operate in favor of a patentee of a secondary invention which combines old ingredients to produce new and useful results.¹¹³

After elaborating on the doctrine of equivalents, the Court applied it to the case. It also eschewed its own analysis of the prior art and the pioneering status, or lack thereof, of the Linde patent.¹¹⁴ The question had been discussed at trial, and that status was explained in the Court's earlier decision on the validity of the Linde patent.¹¹⁵ In its earlier decision, the Supreme Court

107. *Graver Tank*, 339 U.S. at 610.

108. *Id.*

109. *Id.* at 607.

110. *Id.* at 608 (quoting *Sanitary Refrigerator Co. v. Winters*, 280 U.S. 30, 42 (1929)); see *supra* notes 100-03 and accompanying text. This has become known as the three-part *Graver Tank* test.

111. *Graver Tank*, 339 U.S. at 609.

112. *Id.* at 607.

113. *Id.* at 608.

114. *Id.* at 610.

115. *Graver Tank & Mfg. Co. v. Linde Air Prods.*, 336 U.S. 271 (1949). This decision only addressed the validity of the Linde patent. The subsequent *Graver Tank* decision in 1950, see *supra* note 105, is the classical discussion of the doctrine of equivalents and is the *Graver Tank* referred to throughout this Note.

affirmed the trial court's decision that the patentee's invention had produced results that were remarkably different from those of prior methods.¹¹⁶

Thus, the Linde invention was innovative, of high merit and can be classed with the inventions described in *Sanitary Refrigerator* and *Continental Paper Bag*.¹¹⁷ It therefore appears that in *Graver Tank*, the Court was not according broad protection to all patents. Rather, the Court reiterated the view that those non-pioneering inventions which are innovative and really create new art should be protected.¹¹⁸

III. The Doctrine of Equivalents After *Graver Tank*

A. *Expansive Doctrine of Equivalents*

After *Graver Tank & Mfg. Co. v. Linde Air Prods.*,¹¹⁹ it devolved to the Court of Customs and Patent Appeals (CCPA) and the Court of Claims to interpret the doctrine of equivalents in infringement cases because the Supreme Court declined to certify most patent cases.¹²⁰ In *Autogiro Co. of America v. United States*,¹²¹ decided by the Court of Claims, the patents in suit were for rotor structures and control systems on rotary wing aircraft (helicopters).¹²²

The court began its analysis with a comprehensive review of patent infringement law.¹²³ The court stated that literal overlap was only a step and not the entire test of infringement. Infringement could still be found by applying the doctrine of equivalents.¹²⁴ The range of equivalents is dependent upon the status of the invention. The court stated that "pioneer patents are to be given wider ranges of equivalence than minor improve-

116. *Id.* at 274.

117. *See supra* notes 95-103 and accompanying text.

118. *See, e.g., Morley Sewing Mach. Co. v. Lancaster*, 129 U.S. 263 (1889); *see also supra* notes 69-76 and accompanying text.

119. 339 U.S. 605 (1950); *see supra* notes 105-18 and accompanying text.

120. Patent cases were formerly appealed to the CCPA and Court of Claims, as well as circuit courts. The decisions of the predecessor courts are binding on the Court of Appeals, for the Federal Circuit. *See infra* notes 141-43 and accompanying text.

121. 384 F.2d 391 (Ct. Cl. 1967).

122. *Id.* at 401.

123. *Id.* at 397-401.

124. *Id.* at 400.

ment patents.”¹²⁵

At this point, the file history of a patent assumed importance in determining infringement. The court said:

The doctrine of equivalents is subservient to file wrapper estoppel.¹²⁶ It may not include anything within its range that would vitiate limitations expressed before the Patent Office Thus a patent that has been severely limited to avoid the prior art will only have a small range between it and the point beyond which it violates file wrapper estoppel. A patent which is a major departure from the prior art will have a larger range in which equivalence can function.¹²⁷

The court relied heavily on the file histories of the patents in deciding infringement in this case, which involved sixteen patents and a variety of claims. The test for infringement was: determine which of the accused structures do the same work, in substantially the same way to accomplish substantially the same result. In other words, the court applied the *Graver Tank* test.¹²⁸

In *Coleco Indus. v. United States Int’l Trade Comm’n*,¹²⁹ the *Graver Tank* test¹³⁰ was also used to find infringement. The patents in question related to swimming pool frame assemblies.¹³¹ The court held that screws functioning as part of a locking structure in the accused invention were equivalent to tabs with similar function in the patented structure.¹³²

The court agreed that the doctrine of equivalents “arms a patentee against a person who merely substitutes a functionally equivalent element in a device and thereby practices the inven-

125. *Id.*

126. File wrapper estoppel “is the application of familiar estoppel principles to Patent Office prosecution [An] applicant will insert limitations and restrictions for the purpose of inducing the Patent Office to grant his patent. When the patent is issued, the patentee cannot disclaim these alterations and seek an interpretation that would ignore them.” *Id.* at 398-99.

The court pointed out that file wrapper estoppel serves two functions. It “define[s] terms, but also set[s] the barriers within which the claim’s meaning must be kept The prior art cited in the file wrapper gives clues as to what the claims do not cover.” *Id.* at 399.

127. *Id.* at 400-01 (footnote omitted).

128. *Id.* See *supra* note 110 and accompanying text.

129. 573 F.2d 1247 (C.C.P.A. 1978).

130. See *supra* note 110 and accompanying text.

131. *Coleco Indus.*, 573 F.2d at 1250.

132. *Id.* at 1255.

tion without bringing his device within a literal reading of the patent claims."¹³³ However, there was no infringement in this case because the patentee was limited by file wrapper estoppel.¹³⁴ "A patentee having argued a narrow construction for his claims before the United States Patent and Trademark Office (PTO), should be precluded from arguing a broader construction for the purposes of infringement."¹³⁵

*Autogiro*¹³⁶ and *Coleco Indus.*¹³⁷ demonstrate the profound change which had occurred in the doctrine of equivalents analysis. First, an accused invention was subjected to the three-part *Graver Tank* test to determine whether it performed the same function in substantially the same way to produce substantially the same result as the patented invention.¹³⁸ Thereafter, the file history of the patent was examined. Often, even if an accused invention fulfilled all of the infringement criteria, a court would not find infringement because of file wrapper estoppel. Thus, the arguments and amendments made during patent prosecution before the PTO assumed the greatest importance.¹³⁹ The pioneer status of the original patent was, in effect, no longer part of infringement analysis.¹⁴⁰

B. *Early Decisions in the Federal Circuit*

The Court of Appeals for the Federal Circuit (CAFC) was created by Congress in 1982 by merging the Court of Customs and Patent Appeals (CCPA) with the Court of Claims.¹⁴¹ Infringement suits had previously been decided independently by

133. *Id.*

134. *Id.* at 1257. See also *supra* note 126 for a definition of file wrapper estoppel.

135. *Coleco Indus.*, 573 F.2d at 1257.

136. See *supra* notes 121-28 and accompanying text.

137. See *supra* notes 129-35 and accompanying text.

138. See *supra* note 110 and accompanying text.

139. This reasoning had earlier been applied by the Supreme Court only to amendments made before the PTO in *Exhibit Supply Co. v. Ace Patents Corp.*, 315 U.S. 126, 136 (1942) ("[b]y the amendment, [patentee] recognized and emphasized the difference between the two phrases and proclaimed his abandonment of all that is embraced in that difference.").

140. For an example, see the infringement analyses in *Coleco Indus.*, 573 F.2d at 1254-55; see also *Autogiro*, 384 F.2d at 399-401.

141. Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 25 (1982).

the district courts in each circuit and the aim was to develop a consistent body of patent law.¹⁴²

In its first cases¹⁴³ the Federal Circuit applied the same reading of the doctrine of equivalents as had been used in the Court of Claims and the CCPA.¹⁴⁴ *Caterpillar Tractor Co. v. Berco*,¹⁴⁵ concerned the patent for the seal of a lubricated track for crawler type tractors.¹⁴⁶ The Federal Circuit engaged in a traditional analysis of the invention in relation to its prior art and also examined its file history.¹⁴⁷ The court then applied the *Graver Tank* three-part test and held that there was infringement.¹⁴⁸ The dissent disagreed with the court's use of equivalents and argued that the file history precluded the finding of infringement.¹⁴⁹ Thus, arguments over the role of a patent's file history continued to dominate the application of the doctrine of equivalents in determining infringement.

In *Hughes Aircraft Co. v. United States*,¹⁵⁰ the Federal Circuit attempted to clarify the relationship between the doctrine of equivalents and the doctrine of file wrapper estoppel. First, Chief Judge Markey quoted *Graver Tank* extensively.¹⁵¹ He then categorically rejected the view, held by some courts, that virtually any amendment to a claim during its prosecution creates a file wrapper estoppel that limits the patentee to the literal words of the claim and deprives the patentee of protection under the doctrine of equivalents.¹⁵² Instead, Chief Judge Markey stated that "[d]epending on the nature and purpose of the amendment, it may have a limiting effect within a spectrum ranging from great to small to zero."¹⁵³

The patent under consideration was for "store and execute"

142. See generally Rochelle Cooper Dreyfuss, *The Federal Circuit: A Case Study in Specialized Courts*, 64 N.Y.U. L. REV. 1, 3-8 (1989).

143. In its first case, the CAFC adopted as precedent the previous holdings of its predecessor courts. *South Corp. v. United States*, 690 F.2d 1368, 1369 (Fed. Cir. 1982).

144. See *supra* notes 119-40 and accompanying text.

145. 714 F.2d 1110 (Fed. Cir. 1983).

146. *Id.* at 1112.

147. *Id.* at 1114-16.

148. *Id.* at 1115-16.

149. *Id.* at 1117 (Davis, J., dissenting).

150. 717 F.2d 1351 (Fed. Cir. 1983).

151. *Id.* at 1361.

152. *Id.* at 1362-63.

153. *Id.*

spacecraft and described a method for velocity and attitude control.¹⁵⁴ The court agreed that the patented invention was entitled to equivalents protection although it was not a pioneer patent and not entitled to the "very broad range of equivalents to which pioneer inventions are normally entitled."¹⁵⁵ The court held that it was necessary to "apply the doctrine of equivalents to the claimed invention *as a whole*."¹⁵⁶ It was not enough to simply look for "obvious and exact" equivalents, the presence of which would effectively produce literal infringement.¹⁵⁷ The court stressed that "substitution of an embellishment made possible by post-[invention] technology does not avoid infringement."¹⁵⁸ The dissent argued that the prosecution history of the plaintiff's patent precluded a finding that the accused device performed the same function in the same way.¹⁵⁹

In this decision, the Federal Circuit did two things. First, it hearkened back to the requirement for comparing inventions in their entirety before assessing infringement. As the Supreme Court said in *Graver Tank*,¹⁶⁰ "[e]quivalence, in the patent law, is not the prisoner of a formula It does not require complete identity for every purpose and in every respect."¹⁶¹ Second, the *Hughes* court categorically rejected "a wooden application of [file history] estoppel," which would vitiate the doctrine of equivalents and confine infringement analysis to a consideration of literal infringement.¹⁶² Although the *Hughes* decision did not finally lay to rest the arguments over the relationship between equivalents and file history estoppel, subsequent decisions generally adhered to the *Hughes* analysis.¹⁶³

154. *Id.* at 1353.

155. *Id.* at 1362.

156. *Id.* at 1364 (emphasis added).

157. *Id.* at 1364.

158. *Id.* at 1364-65.

159. *Id.* at 1367 (Davis, J., concurring in part and dissenting in part).

160. 339 U.S. 605 (1950). See *supra* notes 105-18 and accompanying text.

161. *Id.* at 609.

162. *Hughes Aircraft*, 717 F.2d at 1362. See *supra* notes 152-53 and accompanying text.

163. *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888 (Fed. Cir.), *cert. denied*, 469 U.S. 857 (1984) (a patent for the optical structure of a projection printer used in the manufacture of integrated circuits was infringed by a projection printer which differed in its adjustment of the curvature and placement of one mirror); *Thomas & Betts Corp. v. Litton Systems, Inc.*, 720 F.2d 1572 (Fed. Cir. 1983) (a single strut

Despite extensive precedent,¹⁶⁴ the Federal Circuit used a different approach to find no infringement in *Lemelson v. United States*.¹⁶⁵ The method claim in issue was "directed to measuring the distance between two surfaces of a workpiece."¹⁶⁶ Judge Baldwin held that "in order for a court to find infringement, the plaintiff must show the presence of every element or its substantial equivalent in the accused device" — the "element by element" test.¹⁶⁷ Thus, there was no infringement because several components of the accused machine did not correspond to the means used in plaintiff's claims.¹⁶⁸

However, in *Martin v. Barber*,¹⁶⁹ Judge Baldwin returned to the position that inventions must be examined in their entirety during infringement analysis, reiterating the "as a whole" test.¹⁷⁰ He vacated the district court's decision on the ground that

although framed in equivalence language, the court's analysis is no more than a substituted test for literal infringement [W]here an accused device avoids literal infringement by changing an element of a claimed invention, it is appropriate to consider . . . whether the changed element operates in substantially the same way as the claimed element.¹⁷¹

Similarly, in *Loctite Corp. v. Ultraseal Ltd.*,¹⁷² the patents

electrical connector infringed upon a double strut patent). See also, *Carman Indus. v. Wahl*, 724 F.2d 932 (Fed. Cir. 1983) (a device which promoted the flow of solids from a bin was infringed by a device which performed this function but not the secondary function of stopping the flow after the vibration ended).

164. See, e.g., *Bayer Aktiengesellschaft v. Duphar Int'l Research B.V.*, 738 F.2d 1237, 1243 (Fed. Cir. 1984) ("the doctrine of file history estoppel [does not always] completely prohibit[] a patentee from recapturing some of what was originally claimed"); *Atlas Powder Co. v. E.I. du Pont De Nemours*, 750 F.2d 1569, 1579-80 (Fed. Cir. 1984) (where the court held infringement although "the accused product avoids literal infringement by changing one ingredient of a claimed composition . . . [because] the changed ingredient has the same purpose, quality and function as the claimed ingredient").

165. 752 F.2d 1538 (Fed. Cir. 1985).

166. *Id.* at 1541.

167. *Id.* at 1551.

168. *Id.* The prosecution (or file) history of the patent in controversy was deemed not significant to the issue. *Id.* at 1550.

169. 755 F.2d 1564 (Fed. Cir. 1985). The claimed patent was for gravity inversion boots and the accused invention was for an ankle supporting device on a tilt table used for the same purpose. *Id.* at 1566.

170. *Id.* at 1568. See *supra* notes 156-62 and accompanying text.

171. *Id.* at 1568.

172. 781 F.2d 861 (Fed. Cir. 1985).

in issue were directed to anaerobic curing compositions.¹⁷³ The Federal Circuit said that the finding of a difference between the claimed and accused inventions is not sufficient to establish that the two devices do not perform in substantially the same way.¹⁷⁴ "That finding . . . would allow the difference itself to dictate a finding of no equivalence, and . . . one could never have infringement by equivalence."¹⁷⁵

The court also pointed to the limited effect of file wrapper estoppel on equivalents analysis, asserting that the reason for a surrender is as important as the nature of what was surrendered.¹⁷⁶ In some cases a patentee can recapture some of what was originally claimed.¹⁷⁷ Thus, in this case, because the accused product "may be using the most important aspect if not the gist of Loctite's inventions, . . . the prosecution history will not necessarily prevent the . . . court from applying the doctrine of equivalents"¹⁷⁸

These cases dramatically demonstrate the struggle within the Federal Circuit in applying the doctrine of equivalents. The concept of a pioneering patent had disappeared, although some opinions still paid lip service to the idea. Instead, the court had become mired in the doctrine of file wrapper estoppel. The court struggled with the questions of what was actually included in it, when to use it, and how far it could go to prevent the application of the doctrine of equivalents.

The court was also divided in its use of the *Graver Tank* three-part test¹⁷⁹ in determining what range of equivalents to accord a given patent. While some courts looked at the whole invention,¹⁸⁰ others applied the test to each separate element¹⁸¹ of the claims in controversy.

173. *Id.* at 866.

174. *Id.* at 870.

175. *Id.*

176. *Id.* at 871 (citing *Bayer Aktiengesellschaft*, 738 F.2d at 1243). *But see* Builders Concrete, Inc. v. Bremerton Concrete Prod. Co., 757 F.2d 255, 260 (Fed. Cir. 1985) (the prosecution history of claims not in suit may be relevant to limit the scope of the claims actually in suit).

177. *Loctite*, 781 F.2d at 871.

178. *Id.*

179. *See supra* notes 110-18 and accompanying text.

180. *See supra* notes 143-63 and accompanying text.

181. *See supra* notes 165-68 and accompanying text.

C. Recent Decisions of the Federal Circuit

The controversy in the Federal Circuit settled down to a struggle over whether to use the "as a whole" or the "element by element" approach. In *Texas Instruments v. Int'l Trade Comm'n*,¹⁸² Judge Newman categorically stated that the claimed invention must be viewed as a whole.¹⁸³ At issue was whether a patent for portable electronic calculators was infringed.¹⁸⁴ The court found that the claimed patent represented a pioneering invention.¹⁸⁵ The court also agreed that "every function described in the patent is performed by the accused calculators."¹⁸⁶ However, "[i]t is not appropriate in this case, where all of the claimed functions are performed in the accused devices by subsequently developed or improved means, to view each such change as though it were the only change from the enclosed embodiments of the invention."¹⁸⁷ Thus, even though there was nothing in the file history of the patent to constrain the breadth of the claims,¹⁸⁸ the court held no infringement.¹⁸⁹ However, Judge Newman allowed that any individual difference by itself might have resulted in a finding of infringement under the "as a whole" theory.¹⁹⁰

In *Perkin-Elmer Corp. v. Westinghouse Elec. Corp.*,¹⁹¹ the Federal Circuit returned to the position that every element of a claim is important.¹⁹² The device in controversy was a resonator coupler for an electrodeless discharge lamp.¹⁹³ The court started the analysis by affirming that the claimed patent was for an improvement and not for a pioneer invention.¹⁹⁴

182. 805 F.2d 1558 (Fed. Cir. 1986).

183. *Id.* at 1569.

184. *Id.* at 1560.

185. *Id.* at 1568.

186. *Id.* at 1567.

187. *Id.* at 1570.

188. *Id.* at 1571.

189. *Id.* at 1570.

190. *Id.* at 1570-72.

191. 822 F.2d 1528 (Fed. Cir. 1987).

192. *Id.* at 1533.

193. *Id.* at 1529. The patentee had employed a tap coupling device whereas the accused product employed a loop coupling. *Id.* at 1531.

194. *Id.* at 1532; see *supra* note 32 and accompanying text for the distinction between pioneer and improvement inventions.

The court stated that a non-pioneer was entitled to some range of equivalents.¹⁹⁵ However, "each element of a claim is material and essential, and in order for a court to find infringement, the plaintiff must show the presence of every element or its substantial equivalent in the accused device."¹⁹⁶ Finally, the court affirmed the district court decision, finding no infringement, on the ground that the accused device did not operate in substantially the same way as the claimed invention.¹⁹⁷

In a strongly worded dissent, Judge Newman argued that the majority had "magnified scientific differences beyond their reasonable meaning"¹⁹⁸ and that the two transformers were interchangeable.¹⁹⁹ She charged that in so doing "the majority has departed even farther from our consistent requirement that the invention as a whole be considered."²⁰⁰

Actually, Judge Newman was correct because in this decision Judge Markey had made a 180 degree turn from his policy and decision in *Hughes Aircraft Co. v. United States*.²⁰¹ There he had said that courts ought to look at the invention as a whole because simply looking for obvious and exact equivalents would be tantamount to a literal infringement analysis.²⁰²

Faced with this split in interpretation of the doctrine of equivalents, the Federal Circuit attempted to bring order to the analysis of the law in *Pennwalt Corp. v. Durand-Wayland, Inc.*²⁰³ The patent in controversy was for a fruit sorter which sorted by color, weight or a combination of the two.²⁰⁴

The district court had found that certain functions of the claimed inventions were missing from the accused devices and that those functions which were performed were substantially different.²⁰⁵ It had used an "element by element" comparison to reach the conclusion that there was no infringement under the

195. *Perkin-Elmer*, 822 F.2d at 1532.

196. *Id.* at 1533 (quoting *Lemelson*, 752 F.2d at 1551).

197. *Id.* at 1535.

198. *Id.* at 1536 (Newman, J., dissenting).

199. *Id.* at 1541 (Newman, J., dissenting).

200. *Id.* at 1542 (Newman, J., dissenting).

201. 717 F.2d 1351 (Fed. Cir. 1983).

202. See *supra* notes 150-62 and accompanying text.

203. 833 F.2d 931 (Fed. Cir. 1987) (en banc), *cert. denied*, 485 U.S. 961 (1988).

204. *Id.* at 933.

205. *Id.* at 935.

doctrine of equivalents.²⁰⁶

A majority of the court, sitting *en banc*, affirmed the district court decision, using *Lemelson v. United States*²⁰⁷ to support the position that each element of the "claim [was] material and essential."²⁰⁸

The court also reviewed the prosecution history of the claimed patent. It found that a position indicator had been added to the original claim to allow patentability of the device over the prior art.²⁰⁹ Because the accused devices had no such component with which to determine the position of the items to be sorted, the court held that they did not function in substantially the same way.²¹⁰

Four judges dissented on the ground that "the majority ha[d] contrived an analytical framework for the doctrine of equivalents that is little more than a redundant literal infringement, which renders the doctrine . . . so unduly restrictive and inflexible as to end its usefulness"²¹¹ The dissent asserted that the *Graver Tank* test should be applied to the allegedly infringing devices on an "as a whole" basis.²¹²

The majority decision was so controversial that Judges Nies and Newman each added a separate addendum containing their views.²¹³ Thus, *Pennwalt* resolved nothing.

IV. Doctrine of Equivalents After *Pennwalt*

A. *Internequine Strife Within the Federal Circuit*

The *Pennwalt* decision has not solved the problem of how to apply the doctrine of equivalents.²¹⁴ As shown below, Federal Circuit decisions continue to rely on either the "as a whole" or the "element by element" approach, depending on which judge is sitting on the panel.

206. *Id.*

207. 752 F.2d 1538 (Fed. Cir. 1985); see *supra* notes 165-68 and accompanying text.

208. 833 F.2d at 935.

209. *Pennwalt*, 833 F.2d 931, 937 (Fed. Cir. 1987).

210. *Id.*

211. *Id.* at 939-40 (Bennett, J., dissenting).

212. *Id.* at 948 (Bennett, J., dissenting).

213. *Id.* at 949 (Nies, J., additional views); *Id.* at 954 (Newman, J., commentary).

214. 833 F.2d 931 (Fed. Cir. 1987).

For example, in *Spectra Corp. v. Lutz*,²¹⁵ the court, in an opinion by Chief Judge Markey, used the "element by element" approach.²¹⁶ The holding was that the dyeing function performed by an accused product could not be substantially the same as that performed by the patented dye toner because the former was missing a polymer present in the claimed dye.²¹⁷ In using the "element by element" approach, the Federal Circuit made a complete reversal from its position in *Loctite Corp. v. Ultraseal Ltd.* There, Judge Baldwin stated categorically that a difference between two patents was not in itself sufficient to obviate infringement by the doctrine of equivalents.²¹⁸

Judge Newman reiterated that equivalence is evaluated in the context of the invention as a whole in the Federal Circuit's second *Texas Instruments* decision, denying a petition for rehearing.²¹⁹ She was attempting to clarify her earlier *Texas Instruments* decision,²²⁰ where the court had found no infringement. That earlier holding was based on the finding that although the accused calculators performed all the functions of the claimed calculators, the means employed were different.²²¹ Therefore, evaluating the claimed invention as a whole, there was no equivalence.²²² In *Graver Tank*²²³ language, the court was saying that, as a whole, the two instruments performed the same function with the same result, but in a different way.

It is interesting to compare this case with *Morley Sewing Machine Co. v. Lancaster*,²²⁴ where the patent was also for an invention composed of several different elements.²²⁵ The Supreme Court had held that because that invention was of a primary character, it was entitled to liberal construction of the

215. 839 F.2d 1579 (Fed. Cir. 1988).

216. *Id.* at 1582.

217. *Id.*

218. 781 F.2d 861, 870 (Fed. Cir. 1985); see *supra* notes 172-78 and accompanying text.

219. *Texas Instruments v. Int'l Trade Comm'n*, 846 F.2d 1369 (Fed. Cir. 1988).

220. 805 F.2d 1558 (Fed. Cir. 1986); see *supra* notes 182-90 and accompanying text.

221. *Texas Instruments*, 846 F.2d at 1370-71.

222. *Id.*

223. See *supra* note 110 and accompanying text.

224. 129 U.S. 263 (1889).

225. See *supra* notes 69-71 and accompanying text.

claims.²²⁶ The Court said:

Where . . . the mechanical functions performed by the machine are, as a whole, entirely new, all subsequent machines which employ substantially the same means to accomplish the same result are infringements, *although the subsequent machine may contain improvements in the separate mechanisms which go to make up the machine.*²²⁷

One might therefore have expected the “as a whole” approach to yield a finding of infringement in the *Texas Instruments* case as well. A close examination of Judge Newman’s opinion leads to the conclusion that the decision actually fits better with the “element by element” approach, something which was not lost on Judge Nies in her dissent from denial of hearing *en banc*.²²⁸ Judge Nies also reiterated that the *Pennwalt* decision should have ended the debate over which standard to use in equivalents analysis, in favor of the “element by element” test.²²⁹

Judge Nies used the “element by element” test in *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*²³⁰ The patents in controversy related to the structure, composition, and production of fused silica optical waveguide fibers.²³¹ The district court had found that the accused fibers, which contained a material to lower the refractive index of the outside layer relative to the core, infringed on the patented fibers which contained a material to increase the index of refraction of the core relative to the outside layers.²³²

Judge Nies restated the *Pennwalt* rule that “infringement requires that each element of a claim or its substantial equivalent be found in the accused device.”²³³ Thus, one might have expected, based on precedent, that this approach would

226. See *supra* notes 72-76 and accompanying text.

227. *Morley*, 129 U.S. 263, 273 (1889) (emphasis added).

228. *Texas Instruments*, 846 F.2d at 1372 (Nies, J., dissenting).

229. *Id.* at 1372-73 (Nies, J., dissenting).

230. 868 F.2d 1251 (Fed. Cir. 1989).

231. *Id.* at 1254-55. “Optical waveguides are a unique type of optical fiber . . . that limit the transmitted light to preselected modes . . .” *Id.* at 1256.

232. *Id.* at 1259.

233. *Id.*

yield a finding of no infringement.²³⁴ However, the court affirmed the finding of infringement, stating that "[a]n equivalent must be found for every limitation of the claim somewhere in an accused device, but not necessarily in a corresponding component" ²³⁵

This result could not have been predicted from earlier Federal Circuit decisions applying the "as a whole" test, such as *Hughes Aircraft Co. v. United States*.²³⁶ This result could not have been predicted from earlier Federal Circuit decisions which had applied the "element by element" test. For instance, *Spectra v. Lutz* was an analogous case where the court used the "element by element" approach.²³⁷ No infringement was found because the accused compound, which produced the same result, lacked a specific ingredient.²³⁸ These cases graphically illustrate²³⁹ that by not taking a coherent approach to the doctrine of equivalents analysis, the Federal Circuit has created confusion.

A recent case which addresses the use of the doctrine of equivalents in an infringement action is *Wilson Sporting Goods v. David Geoffrey & Assocs.*²⁴⁰ The patent in controversy was for the configuration of dimples on a golf ball cover.²⁴¹ The analysis began with review of the prior art and file history²⁴² of the plaintiff's patent.

234. See *supra* notes 165-68, 191-97 & 203-10 and accompanying text.

235. *Corning Glass Works*, 868 F.2d at 1259. The court quoted *Atlas Powder Co. v. E.I. DuPont de Nemours & Co.*, 750 F.2d 1569 (Fed. Cir. 1984). "Where, as here, the accused product avoids literal infringement by changing one ingredient of a claimed composition, it is appropriate for a court to consider in assessing equivalence whether the changed ingredient has the same purpose, quality, and function as the claimed ingredient." *Id.* at 1579-80. Using this language, over 130 years earlier, the Supreme Court found infringement under the "as a whole" rationale. *Winans v. Denmead*, 56 U.S. (15 How.) 330 (1853). See *supra* notes 40-45 and accompanying text.

236. 717 F.2d 1351 (Fed. Cir. 1983); see *supra* notes 150-62 and accompanying text.

237. 839 F.2d 1528 (Fed. Cir. 1988).

238. See *supra* notes 214-18 and accompanying text.

239. See also, *Senmed, Inc. v. Richard Allan Medical Indus.*, 888 F.2d 815 (Fed. Cir. 1989) (where the patent for a skin stapler was estopped by its prosecution history from being accorded any equivalents); *Insta-Foam Prod. v. Universal Foam Sys.*, 906 F.2d 698 (Fed. Cir. 1990) (where a foam mixing and dispensing gun with a replacement nozzle infringed on a patented gun whose nozzle was not replaceable).

240. 904 F.2d 677 (Fed. Cir. 1990).

241. *Id.* at 679.

242. *Id.* at 678-81.

The court then turned to a discussion of how the prior art acted as a limitation on the range of permissible equivalents by limiting the scope of what the inventor could claim.²⁴³ To conceptualize this idea, Judge Rich constructed a hypothetical claim encompassing the accused product and asked whether this claim would have been permitted by the PTO during the original application.²⁴⁴ The court then held that this hypothetical claim would not have been allowed by the PTO "because it reached the prior art, and that therefore the patentee could not be allowed a range of equivalents broad enough to encompass the accused golf balls."²⁴⁵

This opinion used a new approach, construction of a hypothetical claim, to determine the range of equivalents which may be permitted for an invention. However, the court cited no precedent for such an approach, and discussed no relationship between this approach and those used by previous courts. The opinion appears to be based on a whole view of the invention; however, this was only indirectly mentioned.²⁴⁶ Considering the extremes to which several Federal Circuit judges have gone to clarify their personal positions on whether to use the "as a whole" or "element by element" test,²⁴⁷ the reasonable assumption would be that this is an important issue to address in equivalents analysis.

By restricting the range of equivalents to what would have been permitted by the PTO over the prior art,²⁴⁸ Judge Rich was merely restating, in an alternate form, the doctrine of file history estoppel. This doctrine was enunciated almost identically in *Autogiro Co. of America v. United States*²⁴⁹ and has been extensively used by the Federal Circuit since the *Autogiro* decision.²⁵⁰

243. *Id.* at 684.

244. *Id.*

245. *Id.* at 685.

246. *See id.*; *see supra* notes 150-62 and accompanying text for discussion of the "as a whole" test.

247. *See supra* notes 203-13 and accompanying text.

248. *Wilson Sporting Goods*, 904 F.2d at 685.

249. 384 F.2d 391, 400-01 (Ct. Cl. 1967). *See supra* notes 121-27 and accompanying text.

250. *See, e.g., Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1363 (Fed. Cir. 1983).

The "hypothetical claim" analysis used in this case,²⁵¹ determines the range of equivalents permitted a patent based on what claims would have been "allowed by the PTO over the prior art."²⁵² However, this analysis works only where the invention in controversy differs incrementally from the prior art. Where the claimant has carved out a narrow window for his invention, there is a strong probability that the prior art will restrict the allowable equivalents. However, in the situation where the claim is for a new or innovative invention, there is little limitation on the equivalents by the prior art. Extending the *Wilson* court rationale, any pioneer patent would be entitled to unlimited equivalents. As amply demonstrated above,²⁵³ this was clearly not the intention of the Federal Circuit. Thus, Judge Rich's approach does little to advance coherency in doctrine of equivalents analysis.

B. *A Unified Standard for Application of the Doctrine of Equivalents*

The Federal Circuit was founded, in large part, to create a unified and coherent system of patent law.²⁵⁴ As demonstrated in the above sections of this article, a coherent doctrine of equivalents has eluded the court. The doctrine was originally used to grant broad protection from infringement to pioneering and innovative inventions.²⁵⁵ In the 150 years that have elapsed, the doctrine has been overshadowed by the doctrine of file history estoppel.²⁵⁶ The Federal Circuit has consistently stated that "[t]he doctrine of equivalence is subservient to file wrapper estoppel."²⁵⁷ Thus, a court generally begins its equivalents analysis with a determination of whether the patentee has narrowed his

251. *Wilson Sporting Goods*, 904 F.2d at 684.

252. *Id.*

253. See *supra* notes 150-239 and accompanying text.

254. See generally Martin J. Adelman, *The New World of Patents Created by the Court of Appeals for the Federal Circuit*, 20 U. MICH. J.L. REF. 979 (1987); see also Rochelle Cooper Dreyfuss, *The Federal Circuit: A Case Study in Specialized Courts*, 64 N.Y.U. L. REV. 1, 1-8 (1989); see also *supra* notes 141-42 and accompanying text.

255. See *supra* notes 31-77 and accompanying text.

256. See *supra* notes 4, 126-27 & 150-62 and accompanying text for discussions of file history estoppel.

257. *Autogiro Co. of America v. United States*, 384 F.2d 391, 400 (Ct. Cl. 1967).

claims before the PTO. If so, the claimant is estopped from invoking broad equivalents protection.²⁵⁸ If the court finds no estoppel, the *Graver Tank* test²⁵⁹ is applied.

A problem arises at this point because the Federal Circuit is divided on whether to apply the *Graver Tank* standard to the invention as a whole, or to each element.²⁶⁰ Furthermore, the application of one test or the other in a particular infringement suit has continually yielded inconsistent results.²⁶¹

The doctrine of equivalents has a valuable role to play in evaluating whether infringement has occurred. This Note proposes a two-part analysis to resolve the problem created by the split within the Federal Circuit concerning this important doctrine. It is still true that inventions generally fall into two classes — pioneers and improvements.²⁶² In the first step, a court would be required to perform a survey of the prior art²⁶³ in order to determine whether the patented invention is a pioneer or was issued in a crowded art.

The next step would proceed by a bifurcated analysis. If the invention is deemed to be a pioneer, the court would apply the *Graver Tank* test to the invention “as a whole”. If, on the other hand, the invention is for an improvement, the *Graver Tank* test would be applied on an “element by element” basis. At this point in the analysis, the court would examine the prosecution history of the application.²⁶⁴ Thus, file wrapper estoppel would be subservient to the doctrine of equivalents.

This analysis²⁶⁵ would permit the holders of patents for in-

258. See *supra* notes 240-50 and accompanying text.

259. *Graver Tank & Mfg. Co. v. Linde Air Prods.*, 339 U.S. 605 (1950). The *Graver Tank* test is: the accused invention must perform “substantially the same function in substantially the same way to obtain the same result.” *Graver Tank*, 339 U.S. at 608. See also *supra* notes 105-18 and accompanying text.

260. See *supra* notes 182-239 and accompanying text.

261. *Id.* See William E. Player, *ELEMENTAL EQUIVALENCE: Interpreting “Substantially the Same Way” under Pennwalt after Corning Glass*, 72 J. PAT. OFF. Soc’y 47 (1989).

262. See *supra* note 32 and accompanying text.

263. See *supra* note 15 and accompanying text.

264. See *supra* note 4 and accompanying text.

265. A rudimentary form of this type of analysis was employed by the Supreme Court in *McCormick v. Talcott*, 61 U.S. (20 How.) 402 (1858). Of course, at that time, the doctrine of file history estoppel did not exist. See also *supra* notes 46-48 and accompanying text.

novative and pioneering inventions to defend themselves from encroachment by those who would otherwise, under the guise of minor changes in the product or method, be permitted to take advantage of their effort and original work. The application of this analytical framework is presented below in the context of biotechnology patents.

C. *What Standard for Biotechnology Patents?*

As shown in the preceding discussion, the historical protection afforded pioneer and innovative inventions through broad application of the doctrine of equivalents, although sometimes mentioned in Federal Circuit decisions, is no longer of primary importance.²⁶⁶ As the court stated in *Texas Instruments v. Int'l Trade Comm'n*,²⁶⁷ "pioneer status does not change the way infringement is determined"²⁶⁸ Because the Federal Circuit has not provided clear guidelines on how to determine the permitted range of equivalents for a disputed invention, patents involving the use of highly specialized and sophisticated techniques²⁶⁹ are likely to be the most adversely affected. A particularly discouraging example is to be found in biotechnology.²⁷⁰ Biomedical research is now coming to fruition in a large number of biotech-based patents, accompanied by related infringement cases.²⁷¹ How can scientists and pharmaceutical/biotechnology corporations expect the courts to decide equivalents ranges in infringement questions? Can a unified theory of equivalents mitigate the perceived problems?

Genentech, Inc. v. The Wellcome Found. Ltd.,²⁷² concerned a recombinant protein, tissue plasminogen activator (t-PA).²⁷³

266. See *supra* notes 150-81 and accompanying text.

267. 846 F.2d 1369 (Fed. Cir. 1988).

268. *Id.* at 1370.

269. See, e.g., James Ellingboe, *Special Focus - Polymerase Chain Reaction*, 10 *BIOTECHNIQUES* 16 (1990); see also Ann Gibbons, *Molecular Scissors: RNA Enzymes Go Commercial*, 251 *SCIENCE* 521 (1991).

270. For brevity, this article discusses only biotechnology patents. However, these same issues are entirely applicable to chemical and engineering patents as well.

271. Harry F. Manbeck, Jr., *Entering Our Third Century*, 9 *PTC NEWSLETTER*, Fall 1990, at 3-4; see also *Biotech Drugs in the Pipeline*, *CHEMICALWEEK*, May 16, 1990, at 45.

272. 14 U.S.P.Q.2d (BNA) 1363 (D.C. Del. 1990).

273. Tissue plasminogen activator (t-PA) is a protein enzyme which is found in the human body. Its function is to activate, by cutting or cleavage, a protein named plasmi-

The district court examined whether the recombinant protein was infringed by two modified proteins with the same activating function, also produced using recombinant technology. Each accused protein differed slightly from the plaintiff's protein. One contained a single amino acid substitution in the active portion of the t-PA molecule and the second was a deletion derivative of t-PA.²⁷⁴ The court determined that all three of the proteins stimulate dissolution of fibrin clots through enzymatic cleavage of plasminogen to plasmin.²⁷⁵ Thus they have the same intended function and result.²⁷⁶ However, because there were some distinctions in the binding, half-life and rate of clearance between the accused proteins and the patented t-PA, the court held that the former may be achieving their result by some means different from the original protein.²⁷⁷ Thus, the court remanded the case for further findings.²⁷⁸

Although each of the proteins in this dispute was produced by recombinant technology, the opinion contained no discussion of the state of prior art at the time that plaintiff's patent issued to determine whether or not the plaintiff was a pioneer in this field. This is an important consideration for several reasons.

First, the plaintiff's invention might have provided breakthrough technology and information not heretofore available. This could have provided the defendants with enough information to deliberately design t-PA substitutes which would avoid literal infringement yet be competitive in the marketplace because they have the same clinical application.²⁷⁹ As the Supreme Court said in *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*,²⁸⁰ "[o]ne who seeks to pirate an invention . . . may be ex-

nogen. The activated form, plasmin, is involved in dissolving clots in blood vessels. In this capacity, t-PA is used clinically to minimize lasting damage from heart attacks caused by clots in the blood vessels of the heart muscle. *Id.* at 1365.

274. A protein is composed of a chain of specific and ordered number of building blocks called amino acids. t-PA is made up of 527 amino acids. *Id.* A substitution means that one amino acid in the chain is different. A deletion molecule means that several of the amino acids which make up the protein are missing entirely. *Id.* at 1367-68.

275. *Wellcome*, 14 U.S.P.Q.2d (BNA) at 1370.

276. *Id.* at 1371.

277. *Id.*

278. *Id.*

279. *Id.* at 1365-66.

280. 339 U.S. 605 (1950).

pected to introduce minor variations to conceal and shelter the piracy."²⁸¹

Second, a pioneer inventor can only claim to the extent of its own knowledge.²⁸² Although future technological advances may be generally foreseen by a pioneer inventor, the specific limitations are unknowable and thus the claim language cannot include them.²⁸³ The Supreme Court recognized long ago in *Tilghman v. Proctor*²⁸⁴ that it is precisely such an invention which should be protected from infringement by the doctrine of equivalents.²⁸⁵ Even the Federal Circuit has recognized that post-invention advances or modifications of function do not alone negate infringement.²⁸⁶

The application of this author's proposal to the *Wellcome* case would require that the court first make a determination of the claimant's pioneer or improvement status. Once pioneer status is established, application of the *Graver Tank* test on an "as a whole" basis would likely reach a finding of infringement, provided the patentee had not limited his claims during the prosecution.

There are also policy considerations to be advanced for allowing the patentee a broad range of equivalents in the *Wellcome* case. It is entirely possible that plaintiff generally knew, from recombinant work with other proteins, that deletions or substitutions in some parts of the t-PA amino acid chain would likely result in modified but functional t-PA.²⁸⁷ However, without being confident of that information, the inventor was unwilling to delay patenting the invention. By not using the "as a whole" test to permit broad equivalents protection, and instead applying the narrower element by element standard, courts are forcing future inventors to delay patenting an invention until every variable can be claimed.

281. *Id.* at 607.

282. *See, e.g., In re Hogan*, 559 F.2d 595 (C.C.P.A. 1977) (state of the art "disclosed, as the only then existing way to make such a polymer . . .") *Id.* at 606.

283. "To now say that appellants should have disclosed in 1953 the amorphous form which on this record did not exist until 1962, would be to impose an impossible burden on inventors and thus on the patent system." *Id.*

284. 102 U.S. 707 (1880).

285. *Id.* *See supra* notes 63-68 and accompanying text.

286. *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1361-62 (Fed. Cir. 1983).

287. *Wellcome*, 14 U.S.P.Q.2d (BNA) at 1369.

Narrow decisions on equivalents will also encourage defendants in infringement suits to magnify arcane and unimportant scientific differences to avoid infringement, as they have in *Wellcome*. For example, in this case, there is a strong likelihood that differences in the binding affinity and molecule half-life cited by defendants²⁸⁸ are picayune. They do not by themselves allow the inference that the means by which the accused molecules function differ from those of the plaintiff's protein. This case is a perfect example of a situation in which "there is no literal infringement but liability is nevertheless appropriate to prevent what is in essence a pirating of the patentee's invention."²⁸⁹

In *Hormone Research Found. v. Genentech, Inc.*,²⁹⁰ the district court addressed the question of whether a patent for synthesized human growth hormone (HGH)²⁹¹ of a specified amino acid sequence was infringed by recombinantly produced proteins of a slightly different sequence. At the time of patent application, the patentee thought he had identified the correct amino acid sequence of this hormone and had developed a process for its synthesis.²⁹² The amino acid sequence of the patented protein was subsequently found to differ from the sequence of natural HGH, whereas the structure of the accused proteins, recombinantly produced, was found to be identical to that of natural HGH.²⁹³

After determining that there was no literal infringement, the district court reviewed the file history of plaintiff's patent.²⁹⁴ The court held that the patentee had secured patentability by limiting his claim to the specific amino acid sequence of the patented protein and had given up a broad claim to HGH itself or its derivatives.²⁹⁵ The patentee was therefore estopped from encompassing the accused products as equivalents.²⁹⁶ Thus, the

288. *Id.* at 1369-71.

289. *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 870 (Fed. Cir. 1985).

290. 708 F. Supp. 1096 (N.D. Cal. 1988).

291. HGH, a protein, is produced by the human pituitary gland and is involved in the regulation of growth. It is used clinically to treat growth deficiencies. *Id.* at 1098-99.

292. *Id.*

293. *Id.*

294. *Id.* at 1104.

295. *Id.* at 1105.

296. *Id.* at 1104-05.

district court was applying file history estoppel to limit the scope of the patent claims.

In reviewing this decision, the Federal Circuit cited the broad *Graver Tank* three-part test²⁹⁷ and re-examined the prosecution history of plaintiff's patent.²⁹⁸ Judge Archer rejected the district court's holding that the patentee was precluded from recovery by file wrapper estoppel.²⁹⁹ He found that there was ambiguity in the prosecution history of the patent because the nature of the amendments in the file was not clear.³⁰⁰ The court held, therefore, that the reasons for the amendments needed to be established before any infringement ruling could be made.³⁰¹ This decision affirmed the notion that before file wrapper estoppel can be invoked to limit the application of equivalents, "a close examination must be made as to, not only what was surrendered, but also the reason for such a surrender."³⁰² Only if estoppel does not apply, will the court reach the question of the range of permissible equivalents.³⁰³

As in previous Federal Circuit decisions, the *Hormone Research* court's opinion lacked a discussion of plaintiff's pioneering or improvement status. The court did say that until the patentee's method for synthesizing the protein was discovered, HGH could only be obtained in small amounts by tedious extraction methods.³⁰⁴ Thus, the invention provided greater availability for the hormone. However, plaintiff's invention was dependent on a synthetic method which was not entirely successful.³⁰⁵ Furthermore, the defendant's recombinant method for producing the HGH was entirely different and also innovative.³⁰⁶ Thus, the court may have been faced with two inventions, each of which was a big leap beyond its own prior art. In this type of

297. See *supra* note 110 and accompanying text.

298. *Hormone Research*, 904 F.2d 1558 (1990).

299. *Id.* at 1567.

300. *Id.* at 1566-67.

301. *Id.* at 1565-67.

302. *Bayer Aktiengesellschaft v. Duphar Int'l Research*, 738 F.2d 1237, 1243 (Fed. Cir. 1984). See also *supra* notes 4, 126-27, 150-62 and accompanying text for discussions of file history estoppel.

303. *Hormone Research*, 904 F.2d at 1567 n.14.

304. *Id.* at 1560 n.1.

305. *Hormone Research*, 708 F. Supp. at 1107.

306. See *id.* at 1105.

situation, neither invention would be the equivalent of the other.

However, Judge Archer's reversal of the lower court did not look to the relationship between each of the inventions and its prior art. Instead, the decision was based entirely on the premise that there could be no file history estoppel until the intent and effect of the amendments made during the plaintiff's patent prosecution were clarified.³⁰⁷ Thus, even if a district court returns with a finding of no estoppel, it will still have to reach an opinion on equivalents. To accomplish this, the Federal Circuit will once more find itself immersed in a dispute over whether to use the "as a whole" or "element by element" test. Performing the pioneer/improvement analysis first, as suggested in the preceding section, would have permitted the court to resolve the equivalents issue at the outset.

These two cases are good examples of the type which are currently, and will continue to be, in dispute before the Federal Circuit. The technology involved is extremely complex and, as shown in both *Wellcome* and *Hormone Research*,³⁰⁸ the relative importance of different parameters can be difficult to assess. Without a clear mandate on how to apply the doctrine of equivalents, judges and practitioners will continue to face a herculean task.

V. Conclusion

Courts must balance two policies in their decisions on infringement. As this Note demonstrates, one important purpose of the patent statute is to reward innovative and, today, inevitably expensive, research which may result in a marketable product for its inventor.³⁰⁹ The premise presented in this Note is that real innovation comes only with pioneering research and that it is this work the courts must protect. As Justice Douglas said in *Great Atlantic & Pacific Tea Co. v. Supermarket Equip. Corp.*,³¹⁰ "[t]he invention to justify a patent ha[s] to serve the ends of science — to push back the frontiers of chemistry,

307. *Hormone Research*, 904 F.2d at 1568-69.

308. *Wellcome*, 14 U.S.P.Q.2d (BNA) at 1367-69; *Hormone Research*, 904 F.2d at 1565.

309. See *supra* notes 24-30 and accompanying text.

310. 340 U.S. 147 (1950).

physics and the like; to make a distinctive contribution to scientific knowledge."³¹¹

Courts should also take into consideration post-invention advances and their ability to increase the public's available options. While deserving of protection, post-invention modifications are not as innovative as the true pioneers. Thus, the Federal Circuit would be justified in finding in favor of the pioneers on infringement more often.³¹² There is merit in the criticism voiced by the Supreme Court in *Atlantic Works v. Brady*:³¹³

Such an indiscriminate creation of exclusive privileges [patents] tends rather to obstruct rather than stimulate inventions. It creates a class of speculative schemers who make it their business to watch the advancing wave of improvement, and gather its foam in the form of patented monopolies, which enables them to lay a heavy tax upon the industry of the country without contributing anything to the real advancement of the arts. It embarrasses the honest pursuit of business with fears and apprehensions of concealed liens and unknown liabilities to lawsuits and vexatious accountings for profits made in good faith.³¹⁴

The Federal Circuit should return to the original use of the doctrine of equivalents, which gave broader protection to pioneer than to improvement inventions. In so doing, it would bring order to this body of law, thereby fulfilling its mandate and creating a consistency upon which lower courts and inventors could rely.

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311. *Id.* at 154.

312. The Federal Circuit has been described as being pro-patent. See Dreyfuss, *supra* note 254, at 26.

313. 107 U.S. 192 (1883).

314. *Id.* at 200.